

C L A I M S

1. A process for the purification of lactide from a crude lactide vapour product stream comprising at least said lactide, lactic acid, water and linear lactic acid oligomers, said crude lactide vapour product stream being produced by depolymerisation of low molecular weight polylactic acid in a reactor, which process comprises the steps of:

(a) feeding said vapour product stream to a rectification column having a feed inlet at the lower end of the column and an overhead vapour outlet at the upper end of the column, through the said feed inlet, said column being mounted onto the reactor such that components from the vapour product stream liquefying within the column are allowed to flow back into the reactor;

(b) establishing at the upper end of the column a first overhead vapour fraction consisting essentially of water, lactic acid and lactide, and at the lower end of the column a high-boiling fraction consisting essentially of lactide and higher-boiling linear lactic acid oligomers;

c) condensing from said first overhead vapour fraction by means of a condenser at least the lactide to obtain a first liquid lactide containing condensate fraction;

(d) removing the first liquid lactide containing condensate fraction.

2. A process according to claim 1, wherein step c) comprises partially condensing said first overhead vapour fraction, such that at least the water is left in the vapour phase and removed from the condenser.

3. A process according to claims 1 or 2, wherein step c) comprises partially condensing said first overhead vapour fraction, such that at least the water and a major amount of the lactic acid are left in the vapour phase and removed from the condenser.

4. A process according to any of the preceding claims, wherein said first liquid lactide containing condensate fraction comprises at

least 90 wt.% lactide and 0-10 wt.% lactic acid, preferably at least 96 wt.% lactide and 0-4 wt.% lactic acid.

5. A process according to any of the preceding claims, wherein the first liquid lactide containing condensate fraction of step d) is subjected to one or more distillation steps.

6. A process according to claim 5, wherein said one or more distillation steps comprise the steps of:

- 10 (i) feeding the first liquid lactide containing condensate fraction into a distillation column, the column having a bottom end and a top end and a feed inlet between said bottom end and top end, the column further comprising a second overhead vapour outlet at the top end of the column, a liquid outlet at the bottom end and a vapour side outlet located between the feed inlet and the liquid outlet;
- 15 (ii) establishing
  - 20 - a second overhead vapour fraction comprising lactic acid in the top end of the column,
  - a bottom vapour fraction comprising lactide in the bottom end of the column, and
  - 25 - a bottom liquid fraction below the bottom vapour fraction comprising lactide and linear lactic acid oligomers;
- (ii) removing second overhead vapour fraction through the overhead vapour outlet;
- (iii) removing bottom vapour fraction through the vapour side outlet;
- 30 (iv) removing bottom liquid fraction at the liquid outlet.

7. A process according to claim 6, further comprising the step of (vi) condensing the bottom vapour fraction comprising lactide obtained in step (iv) to obtain a second lactide containing condensate fraction.

8. A process according to claims 6 or 7, wherein the bottom vapour fraction and/or the second lactide containing condensate comprise at least 99 wt.%, preferably at least 99.5 wt.%, lactide.

9. A process according to any of claims 6-8, wherein the bottom liquid fraction is recycled to the reactor.

5 10. A process according to any of the preceding claims, said process further comprising the step of removing carboxylic acid and/or hydroxyl containing compounds in any of the lactide comprising fractions obtained in step (d), (iv), (v) or (vi).

10 11. A process according to claim 11, wherein said removing carboxylic acid and/or hydroxyl containing compounds in the lactide fraction obtained in step (d), (iv), (v) or (vi) comprises the steps of:

I. contacting any of the lactide comprising fractions

15 obtained in step (d), (iv), (v) or (vi) with a solid scavenger material comprising at least one functional moiety capable of forming a covalent bond with one or more carboxylic acid and/or hydroxyl containing compounds optionally present in said lactide comprising fraction, thereby allowing the at least one functional moiety of the  
20 scavenger material to selectively react with the one or more carboxylic acid and/or hydroxyl containing compounds optionally present in said lactide comprising fraction to form a covalent bond therewith;

25 II. separating the scavenger material with bound carboxylic acid and/or hydroxyl containing compounds from the lactide comprising fraction to obtain a substantially purified lactide comprising fraction.

30 12. A process according to claim 12, wherein the at least one functional moiety of the solid scavenger material is selected from the group, consisting of epoxy, amine, amide, cyano and anhydride moieties.

35 13. A process according to any of the preceding claims, that is conducted in a continuous manner.

14. A process according to any of the preceding claims, that is conducted under reduced pressure.

15. A process according to any of the preceding claims, that is conducted under pressures in the range of 10-100 mbar, preferably of 20-50 mbar.